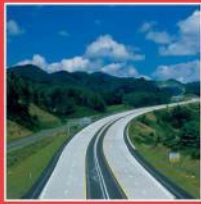




Prioritization 3.0/Strategic Transportation Investments

BOT Approved Ferry Quantitative Scoring Criteria

September 10, 2013



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

FERRY DIVISION





Eligibility Definitions – Ferry Division

Types of Ferry Division Eligible Projects evaluated in P3.0:

Statewide	Regional	Division
Not Eligible	<ul style="list-style-type: none"> • Ramp & Gantry Refurbishments/Replacements • Installations of new Ramp & Gantry • Modernization or expansion of Ferry Shipyard Major Assets (platens, vessel lift, etc.) 	<ul style="list-style-type: none"> • Ferry Vessel Replacements • Ferry Vessel Upgrades and Modernizations • Support Vessel Replacements • Support Vessel Upgrades and Modernizations



Proposed Ferry Project Scoring Overview

	Statewide Mobility	Regional Impact	Division Needs
	N/A	State Maintained Routes	Replacement of Vessels
Eligible Projects:	N/A	Regional	Regional Division
Overall Weights:	N/A	70% Quantitative Data/ 30% Local Input	50% Quantitative Data/ 50% Local Input
Quantities Criteria:	N/A	<ul style="list-style-type: none"> • Safety –15% • Benefit/Cost – 15% • Accessibility/Connectivity – 10% • Asset Efficiency – 10% • Capacity/Congestion – 20% 	<ul style="list-style-type: none"> • Safety – 15% • Benefit/Cost – 15% • Accessibility/Connectivity – 10% • Asset Efficiency – 10%



Ferry Criteria – Safety

Definition: Asset Health Index (AHI) Ratings inclusive of vessels and ramps & gantries

Criteria: Integrity of vessels, ramps and gantries

- Vessels reviewed annually, full inspections completed every three years
- Ramps and gantries inspected every two years

Sources:

- Ferry Division (*Vessel Health Ratings*)
- Structures Management (*NBIS Reports*)

Quantitative Measurement: Ferry System Asset Health

Scoring Scale: 0-100 points

The raw score of the asset health index is used to determine this score.

$AHI = 100 - [(Avg. \text{ Vessel Health Ratings}) * 50\% + (Avg. \text{ Ramp \& Gantry Ratings}) * 50\%]$.

The formula subtracts the average ratings from 100 to provide a final score to accurately reflect where the needs are based on condition.

Weighted %: 15%



Ferry Criteria – Safety

Measurement of Asset Integrity

Route	Ramp & Gantry *	Pro-rata 50%	Vessel Condition *	Pro-rata 50%	Route Integrity Score	Final Score (100-Route Integrity Score)
Hatteras Inlet	48	24	58	29	53	47
Currituck – Knotts Island	63	31.5	45	22.5	54	46
Pamlico River	47	23.5	65	32.5	56	44
Cedar Island – Ocracoke	57	28.5	66	33	61.5	38.5
Cherry Branch – Minnesott	66	33	60	30	63	37
Swan Quarter – Ocracoke	66	33	66	33	66	34
Southport – Ft. Fisher	70	35	71	35.5	70.5	29.5
Division Average**						39.43

**Average rating converted to 100-point scale*

***Applies to non-route specific projects, ex. Shipyard, Tugs, etc.*



Ferry Criteria – Benefit Cost

Definition: Travel Time Savings

Criteria: Captures highway hours (travel time) saved by ferry users
(when ferries utilized rather than driving on alternative route)

Source: National mapping software

Quantitative measurement: Most likely alternate highway route if ferry route is not utilized

Scoring Scale: 0-100 points

1 point per each 10,000 hours saved, not to exceed 100 points

Weighted %: 15%



Ferry – Benefit/Cost

Travel Time Savings

Route	Main Highway Routes	Land Mins	Ferry Mins	Mins Saved	Veh Avg FY08-12	Total Mins	Total Hours	Actual Score	Final Score
Hatteras Inlet	US 264	210	40	170	371,124	63,091,080	1,051,518	105.15	100*
Cherry Branch – Minnesott	NC 101–NC 306 – US 70	69	25	49	249,187	12,210,163	203,503	20.35	20.35
Cedar Island – Ocracoke	NC 101-US 70 - NC 55	290	135	155	66,773	10,349,815	172,497	17.25	17.25
Southport – Ft. Fisher	NC 133–NC 211 - US13	76	35	41	172,041	7,053,681	117,561	11.76	11.76
Pamlico River	US 264-NC 99	78	30	48	74,229	3,562,992	59,383	5.94	5.94
Swan Quarter – Ocracoke	US 264	210	150	60	28,376	1,702,560	28,376	2.84	2.84
Currituck – Knotts Island	NC 168–NC 615	80	45	35	25,914	906,990	15,117	1.51	1.51
Division Average**									22.81



Ferry Criteria – Connectivity / Accessibility

Definition: Accessibility to jobs, services and other points of interest

Criteria: Important destinations within three concentric radii (10, 20, 30 miles) are tallied to determine impacts of ferry route in connecting people to intended destinations

Sources:

- Points of Interest (POI) from maps surrounding ferry routes
- Data collected from N.C. Department of Commerce

Quantitative measurement:

- POI relative to travel area surrounding each route
- Count of points of interest within concentric rings surrounding route

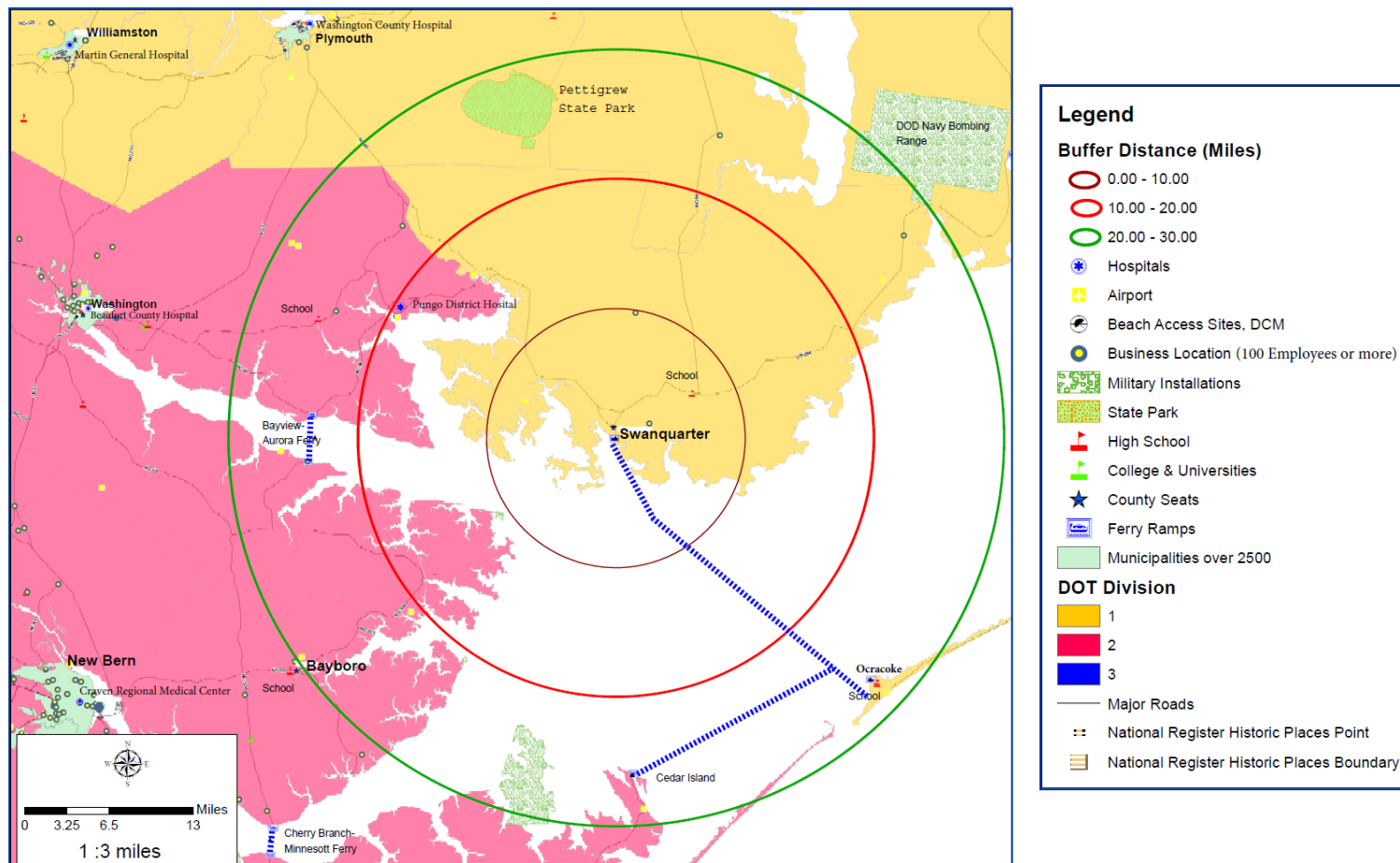
Scoring Scale: 0-100 points

The number of POI within 3 concentric rings (regions) is determined and mapped for each ferry route, then scaled by a multiplying factor (to help produce a score that is reflective of both the number of POI and the proximity of the respective POI. Scaling is as follows: Ring 1 scaled by multiplier of 75%, Ring 2 scaled by multiplier of 50%, and Ring 3 scaled by multiplier of 25%. The scores for each ring are then added to produce a cumulative score for each respective route.

Weighted %: 10%



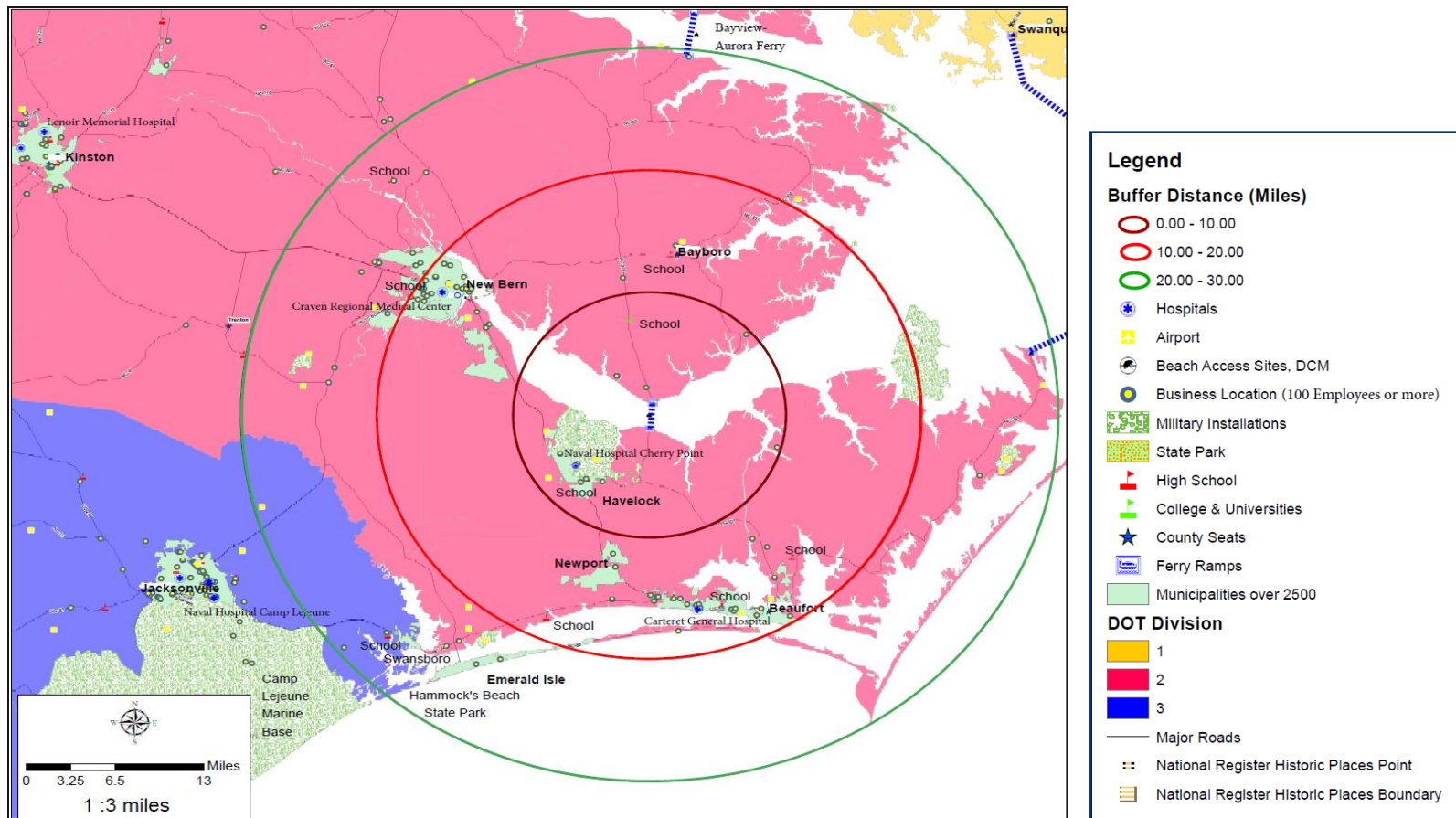
Swan Quarter POI Map



Note: For Large Sound Routes, the POI Scores for each terminus were averaged to produce scores for the entire route itself.



Cherry Branch – Minnesott Beach POI Map





Ferry Criteria – Connectivity/Accessibility

Relative to Jobs, Services, & Other Points of Interest

Route	Route Profile	Ring 1 POI	Ring 2 POI	Ring 3 POI	Total POI		Ring 1 Score	Ring 2 Score	Ring 3 Score	Total Score
Southport – Ft. Fisher	Commuter	23	84	105	212		17.25	42.00	26.25	85.50
Cherry Branch - Minnesott	Commuter	20	95	48	163		15.00	47.50	12.00	74.50
Bayview - Aurora	Commuter	4	28	92	124		3.00	14.00	23.00	40.00
Currituck - Kotts Island	Commuter	8	34	21	63		6.00	17.00	5.25	28.25
Cedar Island	Mix	6	4	27	37					
Ocracoke	Mix	2	2	14	18					
Swan Quarter	Mix	5	5	22	32					
Swan Quarter - Ocracoke	Mix	4.5	4	21.25	29.25		3.38	2.00	5.31	10.69
Cedar Island - Ocracoke	Mix	4	3	20.5	27.5		3.00	1.50	5.13	9.63
Hatteras	Tourist	5	5	1	11					
South Dock	Tourist	4	9	6	19					
South Dock - Hatteras	Tourist	4.5	7	3.5	15		3.38	3.50	0.88	7.75
Division Average*										36.62

Sources: Points of Interest Maps

*** Applies to non-route specific projects, ex. Shipyard, Tugs, etc.**



Ferry Criteria – Asset Efficiency

Definition: Cost effectiveness of maintenance vs. replacement

Criteria: Maintenance costs at 60% of replacement cost is *critical*

Sources: SAP/BSIP and like purchase histories

Quantitative measurement: 3-year maintenance cost/pro-rated 3-year replacement cost

Scoring Scale for current maintenance: 0-100 points

The percentage score of the ratio of the total amount of maintenance expenditures for the respective asset compared to a 3-year pro-rated cost for replacement of the asset.

Weighted %: 10%

General Note: Nationwide Asset Management guidelines for this ratio are as follows:

If less than 40%, then asset is not considered for replacement.

If greater than or equal to 40%, but less than 50%, then consider for replacement.

If greater than or equal to 50%, but less than 60%, then replacement is needed.

If greater than or equal to 60%, then replacement is critical to sustaining operations.



Ferry Criteria – Asset Efficiency

COST EFFECTIVENESS OF CONTINUED MAINTENANCE VS. REPLACEMENT

Method: Comparing 3-year average of maintenance costs against 3-year prorated cost of new purchase over for that 3-year period

Asset	Asset Useful Life (AUL)	Cost for Replacement	Per year Replace cost	3-year Replace cost	3-Year Average Maint Cost	Result	Score
River Class Ferry	30	12,000,000	400,000	1,200,000	695,000	57.92%	57.92
Sound Class Ferry Replacement	30	16,000,000	533,333	1,600,000	845,000	52.81%	52.81
Tug Albemarle Replacement	30	5,000,000	166,667	500,000	205,000	41.00%	41.00
Hatteras Ramp/Gantry	30	4,200,000	140,000	420,000	20,000	4.76%	4.76

Estimated for illustration



Ferry Criteria – Capacity/Congestion

Definition: Evaluation of traffic left and number of trips

Criteria: Establishes need to enhance capacity and reduce congestion

Source: Based on monthly traffic report

Quantitative measurement: Counts of individual vehicles left in queue vs. vehicles loaded and carried from origin to destination.

Scoring Scale: 0-100 points

This score is the percentage of the vehicles left behind at each departure as compared to the total number of vehicles carried by the route in a year time frame.

Weighted %: 20%



Ferry Criteria – Capacity/Congestion

FY 2012 Vehicles Transported/Left Behind

Route	Total Vehicles Carried (TVC)	Vehicles Left Behind (VLB)	Yearly Average Percentage (VLB/TVC)*100	Final Score
Hatteras Inlet	264,508	118,447	44.78	44.78
Southport – Ft. Fisher	177,499	15,839	8.9	8.90
Swan Quarter – Ocracoke	36,295	738	2.03	2.03
Cedar Island – Ocracoke	60,672	1,099	1.81	1.81
Cherry Branch - Minnesott	231,948	1,762	0.76	0.76
Pamlico River	69,750	239	0.34	0.34
Currituck – Kotts Island	23,593	24	0.10	0.10
Division Average**	864,265	138,148	15.98	15.98

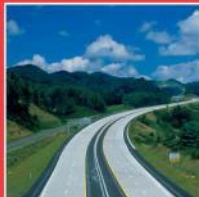
*****Applies to non-route specific projects, ex. Shipyard, Tugs, etc.***

-- This scoring criteria only applies for projects that are eligible for Regional Impact funds.



Ferry Criteria – Scoring Examples

PROJECT	SAFETY				BENEFIT COST				CONNECTIVITY				ASSET EFFICIENCY				CAPACITY/CONGE	
	Health Index Rating	Raw Score	Div Pts 15%	Reg Pts 15%	Travel Time Saved 1k hrs/yr	Raw Score	Div Pts 15%	Reg Pts 15%	Points Of Interest Map Index	Raw Score	Div Pts 10%	Reg Pts 10%	3 Year Comparison Maint Cost/New	Raw Score	Div Pts 10%	Reg Pts 10%	Vehicles Left/Carried x 1,000	Raw Score
Sound Class Vessel Replacement : MV SEA LEVEL	70.6	25	3.75	3.75	11	11	1.65	1.65	50	50	5	5	0.26	0	0	0	N/A	0
New River Class Vessel: SOUTHPORT	75.9	25	3.75	3.75	47	47	7.05	7.05	100	100	10	10	0.48	35	3.5	3.5	N/A	0
Sound Class Vessel Replacement : PAMLICO	49.1	100	15	15	69	69	10.35	10.35	60	60	6	6	0.77	100	10	10	N/A	0
Hatteras Ramps/Gantries-Anticipate Fall '13: EMERGENCY	53	75	11.25	11.25	1052	100	15	15	50	50	5	5	1.55	100	10	10	44.78	100
New River Class Vessel: CHICOMACOMICO	44.2	100	15	15	1052	100	15	15	50	50	5	5	0.32	0	0	0	44.78	100
Southport: Replace Dolphins	70.5	25	3.75	3.75	47	47	7.05	7.05	100	100	10	10	4.42	100	10	10	8.9	100
Tug Albemarle	52.8	75	11.25	11.25	DIV	57	8.55	8.55	DIV	54	5.4	5.4	0.60	100	10	10	DIV	43
Cedar Island: Replace Dolphins	61.5	50	7.5	7.5	69	69	10.35	10.35	60	60	6	6	3.13	100	10	10	1.81	40
New River Class Vessel: KINNAKEET	55	75	11.25	11.25	204	100	15	15	85	85	8.5	8.5	0.14	0	0	0	0.76	20
Additional rail cars for shipyard to expand capacity	DIV-Exp	50	7.5	7.5	DIV	57	8.55	8.55	DIV	54	5.4	5.4	DIV-Exp	70	7	7	DIV	43
Cherry Branch: River Class LUPTON	63	50	7.5	7.5	204	100	15	15	85	85	8.5	8.5	0.36	0	0	0	0.76	20
Curriutck: Bulkhead, Dolphins & Berm	54	75	11.25	11.25	15	15	2.25	2.25	65	65	6.5	6.5	2.42	100	10	10	0.10	0



Ferry – Recommended Criteria

Criteria	Proposed Weight
DIVISION NEEDS 50%	
Safety (Route Health Index)	15%
Benefit/Cost (Travel Time)	15%
Accessibility/Connectivity	10%
Asset Efficiency	10%
REGIONAL IMPACT 70% <i>(Division plus 'Capacity/Congestion')</i>	
Capacity/Congestion	20%